

(14) Given:  $\text{Min}_{\alpha} \int_{-1}^1 [x - \alpha x^2]^2 dx$

Solve the minimization problem and determine whether there is a unique value of  $\alpha$  that gives the minimum.  $\alpha$  is allowed to range over all real numbers. Approximating the function  $f(x) = x$  with polynomials of the form  $\alpha x^2$ .